

Marvyn Inga

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Education

Ph.D. in Physics

University of Campinas - UNICAMP

São Paulo, Brazil

2015 - Current

M.Sc. in Physics

University of Campinas - UNICAMP

São Paulo, Brazil

2013 - 2015

B.Sc. in Physics

National University of Engineering - UNI

Lima, Peru

2006 - 2012

Summary

- Experience working with optics and photonics, with emphasis on the experimental work.
- Strong capacity to design science experiments and automate sophisticated instruments.
- Proficient in a variety of specialized computer programs to acquire, analyze, and visualize data.
- Considerable experience teaching students at the undergraduate level.

Languages

Spanish Native

Portuguese Fluent

English Professional

Projects

Kerr optical frequency comb generation in silica microresonators

UNICAMP, 2016-2020

Optical frequency combs (OFCs) are energy-efficient light sources consisting of a series of discrete equally spaced lines in the frequency domain. OFCs can be used for frequency metrology, precision spectroscopy, distance measurement or telecommunications, just to name a few applications. In this project, we engineered the group velocity dispersion of silica microresonators with the intention to generate more suitable OFCs via the Kerr nonlinearity. For example, in wedge microresonator we did it by controlling its sidewall angle without affecting significantly the free spectral range. In spherical microresonator, we used ALD alumina coatings of different thicknesses with the same intention. We published our findings in scientific journals like [Optics Letters](#) and [APL Photonics](#). My contribution to this project was principally in the experimental work, automating instruments, acquiring and analyzing data. Among others things, I wrote Python scripts with different objectives like identifying and characterizing all mode families through their optical properties (e.g., quality-factor or extinction ratio) or analyzing the dispersion of the microresonators from dense optical spectra.


Tunable light filters

SAMSUNG & UNICAMP, 2017

It was a partnership between SAMSUNG and the Device Research Laboratory (LPD-Unicamp) where I participated in contributing to the colour theory transformations and algorithms necessary to identify colors emitted by the homemade filters. For this, I used an spectrometer and a Python [package](#) for colour science.

High sensitivity spectroscopy

UNICAMP, 2014-2015

In this project, I demonstrated the possibility of using optical cavities of moderate finesse for measurements of small absorption coefficients of nearly transparent liquid and solid samples. With this sensitive technique, based on measurements of ring-down times, I isolated the absorption coefficient of liquids contained inside a transparent cuvette oriented at Brewster's angle. This project was important to acquire experience working on spectroscopy and free-space optics. [Link in portuguese](#) 

Magnetic properties of CuO₂ nanoparticles on graphite and graphene

UFABC, 2012

Here, I focused on obtaining graphene from highly oriented graphite blocks using the scotch tape method. Afterwards, we obtained nanoparticles by laser ablation and deposited on graphene samples. The optical and magnetic characterization of the samples were done with the intention of detect changes in their properties.

Publications

Journals

- M. Inga, L. Fujii, J. M. da Silva Filho, J. Quintino, A. Ferlauto, F. C. Marques, T. P. M. Alegre, and G. S. Wiederhecker. Alumina coating for dispersion management in ultra-high Q microresonators. [APL Photonics](#) 5, 116107 (2020). This article was chose by the editors as a Featured Article. 

- L. Fujii, M. Inga, J. H. Soares, Y. A. V. Espinel, T. P. Mayer Alegre, and G. S. Wiederhecker. Dispersion tailoring in wedge microcavities for Kerr comb generation. *Optics Letters* Vol. 45, Issue 12, pp. 3232-3235 (2020). [↗](#)

Conferences

- M. Inga, L. F. dos Santos, J. M. C. da Silva Filho, Y. A. V. Espinel, F. C. Marques, T. P. M. Alegre, and G. S. Wiederhecker. Tailoring group-velocity dispersion in microspheres with alumina coating. In *CLEO*, pp JTh2C.4. Optical Society of America (2020). [↗](#)
- L. Fujii, M. Inga, J. H. Soares, T. P. Mayer Alegre, and G. S. Wiederhecker. Dispersion Control in Silicon Oxide Wedge Microdisks. In *CLEO*, pp. JTu2A-111. Optical Society of America (2018). [↗](#)

Sharing and curation of data and software

- M. Inga, L. Fujii, J. M. da Silva Filho, J. Quintino, A. Ferlauto, F. C. Marques, T. P. M. Alegre, and G. S. Wiederhecker. (2020). Dataset and Simulation Files for article "Alumina coating for dispersion management in ultra-high Q microresonators" (Data set v1.0) [Zenodo](#) [↗](#).

Teaching Experience

Electric Circuits and Electromagnetism

UNIVESP, 2019-II

Employed on a temporary contract by the UNIVESP in teaching-related responsibilities.

Experimental Physics IV: Alternating Current and Optics

UNICAMP, 2015-II, 2016-II

Participating in the Docent Training Stage Program at UNICAMP.

Experimental Physics III: Electricity and Magnetism

UNICAMP, 2014-II, 2016-I

Participating in the Docent Training Stage Program at UNICAMP.

Professional Affiliation

Optical Society of America (OSA)

2007-Current

Founder member of the OSA Student Chapter UNI, Lima, Peru. Currently, as a member of the OSA Student Chapter UNICAMP, SP, Brazil.

Computer skills

- I use Latex or Google Docs for scientific reports and Mendeley as a reference manager. For making scientific illustrations for journal articles, I use Inkscape or Blender. Frequently, my presentations have been done in Impress or Google Slides.
- I use pyVISA and PyQt to control instruments and automate experiments. For data exploration and visualization, I use Jupyter notebooks, Pandas, Numpy, Scipy, Sympy, and Matplotlib.
- I use preferentially Linux as a development and production environment.
- I have a strong preference for open-source software, but if I have access to competitive proprietary software like Comsol, Mathematica or Matlab, I will be able to use them too.
- I usually use Microsoft Teams for communication and collaboration.

Certifications

I am continually updating and improving my programming skills to meet new challenges and changing needs.

• Python for Data Science

Issued by IBM on 2020. The badge earner is able to write their own Python scripts and perform basic hands-on data analysis using IBM's Jupyter-based lab environment. [See credential](#) [↗](#)

• Data Analysis Using Python

Issued by IBM on 2020. This badge earner understands the essential steps necessary to analyze data in Python using multi-dimensional arrays, manipulating DataFrames in pandas, using SciPy library of mathematical routines and performing machine learning using scikit-learn. [See credential](#) [↗](#)

• Data Visualization Using Python

Issued by IBM on 2020. This badge earner understands how Python libraries such as Matplotlib, Seaborn and Folium are used for the creation and customization of graphical representation outputs for both small and large-scale data sets. [See credential](#) [↗](#)

• Applied Data Science with Python

Issued by IBM on 2020. This badge earner is able to code in Python for data science. They can analyze and visualize data with Python with packages like scikit-learn, matplotlib and bokeh. [See credential](#) [↗](#)

Interests

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|------------------------|---------------------------|-------------------|----------------------|
| • Microcomb technology | • Optical spectroscopy | • Optical sensing | • Biophotonics |
| • Data Analyst | • Artificial Intelligence | • 5G Technology | • Digital innovation |

References

Two professors with whom I worked very closely in my graduate and postgraduate studies are, respectively,

Dr. Carmen Eyzaguirre Professor at [Optics and Photonics Laboratory](#) - UNI. [✉ ceyzaguirre@uni.edu.pe](mailto:ceyzaguirre@uni.edu.pe)

Dr. Gustavo Wiederhecker Professor at [Device Research Laboratory](#) - UNICAMP. [✉ gsw@unicamp.br](mailto:gsw@unicamp.br)